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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/690,996      | 10/22/2003  | Tan Kim Hwee         | APS02-017           | 5668             |

7590 02/23/2005

STEPHEN B. ACKERMAN  
28 DAVIS AVENUE  
POUGHKEEPSIE, NY 12603

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| EXAMINER |
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VU, QUANG D

|          |              |
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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2811

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/690,996

**Applicant(s)**

HWEE ET AL.

**Examiner**

Quang D. Vu

**Art Unit**

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 13-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/29/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election with traverse of group II in the reply filed on 11/15/04 is acknowledged. The traversal is on the ground(s) that the restriction is not proper. This is not found persuasive because group II (claims 13-15) and group I (claims 1-12) are related as process of making and product made, respectively. Additionally, the device of group I (claims 1-12) invention could be made by as a materially different process. For example, positioning the solder bumped semiconductor chip in contact with the surface metallized substrate, and then injecting a no-flow underfill in a space between the semiconductor chip and the surface metallized substrate, instead of disposing a no-flow underfill to the surface metallized substrate and positioning the solder bumped semiconductor chip in contact with the surface metallized substrate.

The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,814,401 to Gamota et al.

Regarding claim 13, Gamota et al. (figure 2) teach a method of fabricating a semiconductor package, the method comprising the steps of:

- providing a semiconductor chip (20) with a plurality of solder bumps (22) on the surface;
- providing a substrate (21) with a metallized top surface (27);
- disposing a no-flow under fill (14) to the metallized surface of the surface metallized substrate (27);
- positioning the solder bumped (22) semiconductor chip in contact with the surface metallized substrate (27) to form an assembly;
- curing the no-flow underfill (column 4, lines 25-27); and
- reflowing the assembly (column 4, lines 28-31).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,814,401 to Gamota et al. in view of US Patent No. 6,677,179 to Yin et al.

Regarding claim 14, Gamota et al. differ from the claimed invention by not showing the curing process is in an inert environment. However, Yin et al. teach the curing process can be conducted in an inert atmosphere (column 4, lines 45-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate

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the teaching of Yin et al. into the device taught by Gamota et al. in order to improve the thermal coefficient of expansion of the underfill material.

Regarding claim 15, Gamota et al. differ from the claimed invention by not showing the reflow process is in an inert environment. However, Yin et al. teach the reflow process can be conducted in an inert atmosphere (column 4, lines 45-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Yin et al. into the device taught by Gamota et al. in order to improve the thermal coefficient of expansion of the underfill material.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D. Vu whose telephone number is 571-272-1667. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

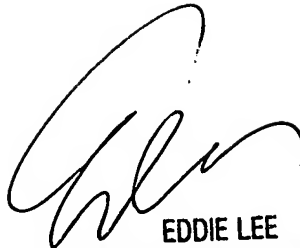
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qv

February 16, 2005



EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800